the other features in accordance with the invention.

Other embodiments will occur to those skilled in the art and are within the following claims:

What is claimed is:

1. A flaw detection system using acoustic Doppler effect for detecting flaws in a medium wherein there is relative motion between the medium and system comprising:

transducer means, spaced from the medium to be inspected, for introducing to and sensing from the medium an acoustic signal that propagates in said medium at a predetermined frequency; and

means, responsive to the sensed propagating acoustic signal, for detecting in the sensed acoustic signal the Doppler shifted frequency representative of a flaw in the medium.

2. The flaw detection system using acoustic Doppler effect of claim 1 in which said transducer means includes a separate transmitter and receiver.

3. The flaw detection system using acoustic Doppler effect of claim 1 in which said transducer means is an ultrasonic transducer and said acoustic signal is an ultrasonic signal.

4. The flaw detection system using acoustic Doppler effect of claim 1 in which said transducer transmits an acoustic signal for propagation in said medium.

5. The flaw detection system using acoustic Doppler effect of claim 1 in which said transducer transmits optical energy for inducing the acoustic signal in said medium.

6. The flaw detection system using acoustic Doppler effect of claim 5 in which said transducer includes a laser for transmitting said optical energy.

7. The flaw detection system using acoustic Doppler effect of claim 1 in which said transducer includes an acoustic receiver.

8. The flaw detection system using acoustic Doppler effect of claim 1 in which said transducer includes an electromagnetic acoustic transmitter and receiver for inducing an acoustic signal into said medium and sensing the Doppler shifted acoustic signal.

9. The flaw detection system using acoustic Doppler effect of claim 1 in which said means for detecting includes a spectrum analyzer for distinguishing the Doppler effect frequency.

10. The flaw detection system using acoustic Doppler effect of claim 9 in which said means for detecting includes a thresholding circuit for identifying a preselected level as a flaw.

11. The flaw detection system using acoustic Doppler effect of claim 1 in which said means for detecting includes a bandpass filter and a peak detector for distinguishing the Doppler effect frequency.

12. The flaw detection system using acoustic Doppler effect of claim 11 in which said means for detecting includes a thresholding circuit for identifying a preselected level as a flaw.

13. The flaw detection system using acoustic Doppler effect of claim 1 in which said means for detecting includes an A/D converter and a digital filter for distinguishing the Doppler effect frequency, and a thresholding circuit for identifying a preselected level as a flaw.

14. The flaw detection system using acoustic Doppler effect of claim 1 in which said medium is a railroad rail.

15. The flaw detection system using acoustic Doppler effect of claim 1 in which said transducer means transmits to the surface of the medium and receives from the surface of the medium an acoustic signal and the flaws detected are surface flaws.

16. The flaw detection system using acoustic Doppler effect of claim 1 in which said transducer means induces an acoustic signal internally in the medium and the flaws detected are internal flaws.

17. The flaw detection system using acoustic Doppler effect of claim 1 in which said transducer means includes a laser vibrometer interferometer for sensing the acoustic signal propagating in the medium.

18. A flaw detection system using acoustic Doppler effect for detecting surface flaws in a medium wherein there is relative motion between the medium and system comprising:

acoustic transducer means, spaced from the medium to be inspected, for transmitting an acoustic signal to and receiving the reflected acoustic signal at a predetermined frequency from the surface of the medium to be inspected; and

means, responsive to the reflected acoustic signal, for distinguishing the Doppler shifted frequency in the reflected acoustic signal from the predetermined frequency of the transmitted acoustic signal representative of a surface flaw in the medium.

19. A flaw detection system using acoustic Doppler effect for detecting flaws in a medium wherein there is relative motion between the medium and system comprising:

transducer means, spaced from the medium to be inspected, for inducing an acoustic signal to propagate in the medium at a predetermined frequency and sensing the propagating acoustic signal in the medium; and

means, responsive to the sensed propagating acoustic signal, for distinguishing the Doppler shifted frequency representative of a flaw in the medium.

20. The flaw detection system using acoustic Doppler effect for detecting flaws of claim 19 in which said transducer means includes an electromagnetic acoustic transducer for inducing and sensing the acoustic signal.

21. The flaw detection system using acoustic Doppler effect for detecting flaws of claim 19 in which said transducer means includes a transmitter and a receiver and said transmitter includes a laser for locally heating the medium to generate acoustic signals.